Recommendation of the Scientific Expert Group on Occupational Exposure Limits for Dipropyleneglycol monomethylether

8 hour TWA	:	50 ppm (308 mg/m³)
STEL (15 mins)	:	-
Additional classification	:	"skin"

Substance:

Dipropyleneglycolmonomethylether

CH_3-O-CH_2-CH(CH_3)-O-CH_2-CH(CH_3)-OH

Synonyms	:	Dipropyleneglycolmethyl ether; DPGME	
EINECS N°	:	252-104-2	
EEC N°	:	-	Classification: -
CAS N°	:	34590-94-8	
MWt	:	148.2	

Conversion factor (20°C, 101kPa) : 6.16 mg/m³ = 1 ppm

Occurrence/use:

Propylene glycol ethers are colourless liquids with an ether-like odour. They are completely miscible in water and a number of organic solvents. They have a MPt of -83°C, a BPt of 184 - 197°C and a vapour pressure of 0.06 kPa at 25°C. They have a vapour density of 5.15 times that of air. The odour threshold is about 35 ppm (210 mg/m³).

Commercial DPGME is a mixture of four isomers with 1-(2-methoxy-1-methylethoxy)-2- propanol being the major one. Propylene glycol ethers are used as solvents for paints, lacquers, resins, oils and fats.

Health Significance:

Acute exposure to high levels of DPGME results in depression of the central nervous system. Rats exposed to 500 ppm (3080 mg/m³) for 7 hours showed initial signs of slight narcotic effects which rapidly disappeared. Application of 5 and 10 ml/kg DPGME to the shaved skin of rabbits, 5 times/wk for 90 days, resulted in narcosis and deaths (Rowe et al, 1954). Rowe et al (1954) also exposed rats, rabbits, guinea pigs and monkeys to approximately 300 ppm (1848 mg/m³) DPGME for 26-31 weeks (7h/d, 5d/w). Besides slight transient narcotic effects and slightly elevated relative liver weights in rats and minor changes in the liver of female guinea pigs, no effects were observed. In a more recent study, no toxic effects were observed in rats and rabbits after inhalation of 15, 50 and 200 ppm (92, 308 and 1232 mg/m³), 6h/d, 5d/w for 90 days (Landry and Yano, 1984). The concentration of the major isomer of DPGME was quoted as 84.5% in this study.

DPGME was not mutagenic to Salmonella typhymurium with or without metabolic activation and caused no chromosomal aberrations in Chinese Hamster Ovary cells or unscheduled DNA synthesis in rat hepatocytes.

Studies of the developmental toxicity in rats and rabbits provided no evidence of selective toxicity to the fetus at 300 ppm (49 mg/m³) DPGME (Miller, 1987).

No carcinogenicity data are available.

Recommendation:

The study of Landry and Yano (1984), indicating a NOAEL of 200 ppm (1232 mg/m³) for systemic effects, was considered to be the best available basis for proposing occupational exposure limits. An uncertainty factor of 5 was applied to allow for the absence of human data. Taking into account the preferred value approach, and the mild effects seen in Rowe et al (1954) at 300 ppm (1848 mg/m³), the recommended 8-hour TWA is 50 ppm (308 mg/m³). No STEL (15 mins) was considered necessary. A “skin” notation was recommended as dermal absorption could contribute significantly to the total body burden.

At the levels recommended, no measurement difficulties are foreseen.

Key Bibliography:

Henschler, D. (ed.) Criteria document of occupational exposure limits: Dipropyleneglycolmonomethylether (28.03.1985) VCH Weinheim.

Arbete och hälsa (1990) 32. NEG and NIOSH basis for an occupational health standard: Propylene glycol ethers and their acetates.

Rowe, V.K., McCollister, D.D., Spencer, H.C., Oyen, F., Hollingsworth, R.L. and Drill, V.A. (1954).Toxicology of mono-, di- and tri-propylene glycol methyl ethers. Arch. Ind. Hyg. Occup. Med. 9, 509-525.

Landry, T.D. and Yano, B.L. (1984). Dipropylene glycol monomethylether: a 13-week inhalation toxicity study in rats and rabbits. Fund. Appl. Toxicol. 4, 612-617.

Miller, R.R.(1987). Metabolism and disposition of glycol ethers. Drug Metab. Rev. 18, 1.